In the Claims:

1. (previously presented) A membrane battery vent, comprising a battery case, at least one perforation in the battery case, a porous substrate adjacent the perforation in the battery case for venting batteries, a gas selective permeable membrane integral with the porous substrate, further comprising a catalytic layer and a diffusion layer on the membrane forming a gas recombination mechanism for recombining gases evolved from within the battery case and for venting the battery.

2. (original) The membrane of claim 1, wherein the membrane passes hydrogen gas preferentially over other gases.

3. (original) The membrane of claim 1, wherein the membrane passes hydrogen gas preferentially over other gases of water, carbon dioxide, and oxygen.

4. (cancelled) without prejudice.

5. (currently amended) ~~The membrane of claim 1,~~ A membrane battery vent, comprising a battery case, at least one perforation in the battery case, a porous substrate adjacent the perforation in the battery case for venting batteries, a gas selective permeable membrane integral with the porous substrate, further comprising a catalytic layer and a diffusion layer on the membrane forming a gas recombination mechanism for recombining gases evolved from within the battery case and for venting the battery, further comprising a catalytic surface on both sides of the membrane for acting as a gas recombination mechanism of gases evolved from within the battery case.

6. (original) The membrane of claim 1, wherein the membrane further comprises a catalytic surface from catalysts metals from the transition metal elements, one or more components of platinum, palladium, nickel, copper, silver, chromium, molybdenum, tungsten, cobalt, iron, ruthenium, titanium, zirconium, vanadium, niobium, tantalum, or be alloyed with elements such as carbon, silicon and tin for acting as a gas recombination mechanism of the gases hydrogen and oxygen evolved from within the battery case.

7. (original) The membrane of claim 1, wherein the membrane is formed by coating a porous substrate.

8. (original) The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with selectively permeable materials.

9. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate of etched nuclear particle track dielectric films with selectively permeable materials.

10. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, porous plastics, porous metals, porous glasses, porous ceramics, or porous semiconductors, with selectively permeable materials.

11. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, etched nuclear particle track dielectric films of polycarbonate plastic, polyester, polyimide, or polypropylene, with selectively

permeable materials.

12. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, of porous polyethylene, porous polyethersulfone, with selectively permeable materials.

13. (original) The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with selectively hydrogen permeable materials selected from the transition metals, transition metal compounds or alloys.

14. (original) The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with vacuum deposited selectively permeable materials of Pt, Pd and its alloys, Pd/Ag alloy, Pd/Cu alloy, Ti/Ni alloy, AB_2 (e.g. $ZrMn_2$) or AB_5 (e.g. $LaNi_5$) coatings, La, Ti, Zr, V, Nb, Ta, Cr, Mo, W, Fe, Ru, or Co.

15. (original) The membrane of claim 1, wherein the membrane has a gas permeable coating on it.

16. (original) The membrane of claim 1, wherein the membrane further comprises a gas permeable coating of silicone rubber, polyvinyl chloride, polyethylene, fluorosilicone, nitrile silicone, natural rubber, polytetrafluroethylene, polymer electrolytes, or perfluorosulfonic acid.

17. (original) The membrane of claim 1, wherein the membrane further comprises electrolytes in contact with selective permeable films for electrochemical catalysis of hydrogen, or oxygen or catalytic promotion of hydrogen oxygen recombination.

18. (previously presented) The membrane of claim 1, wherein the membrane further comprises a gas permeable coating of electrolytes in contact with selective permeable films for electrochemical catalysis of hydrogen, or oxygen or catalytic promotion of hydrogen oxygen recombination also provides the diffusion layer for limiting recombination to a surface of catalysts or rate of recombination.

19. (original) The membrane of claim 1, wherein the membrane further comprises a non-selective gas permeable coating and hydrogen selectively permeable coating coated over a non-selective gas permeable coating.

20. (original) The membrane of claim 1, wherein the membrane further comprises diffusion gas mats placed on the membrane.

21. (original) The membrane of claim 1, further comprising a seal for sealing the membrane to the battery case and for diffusing gas through the perforation in the battery case.

22. (original) The membrane of claim 21, wherein the seal is provided with a heat or pressure stamp at least partially around the perforation in the battery case.

23. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a porous substrate, thereby forming a porous membrane, and further comprising layers of selectively permeable materials on the substrate and gas diffusion mats, sealed to the substrate and sealed to the battery case for diffusing gas through the

perforation in the battery case.

24. (original) The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of substrate, etched nuclear particle track dielectric films with selectively permeable materials, and further comprising gas diffusion mats sealed to the membrane and to the battery case for diffusing gas through a vent hole in the battery case.

25. (original) The membrane of claim 1, wherein the membrane further comprises a pressure relief valve.

26. (original) The membrane of claim 1, wherein the membrane forms a pressure relief valve or burst foil.

27. (original) A battery vent comprising a battery case having at least one opening and a gas selective permeable catalytically active gas recombination membrane secured over the opening in the battery case for venting batteries.

28. (original) A gas vent for batteries, comprising a sealed battery container, a perforation in the sealed battery container, a gas selective permeable catalytically active membrane vent and gas recombination mechanism for batteries, integral with a porous substrate and covering the perforation in the sealed battery container and a perimeter seal extending at least partially around the membrane, and sealing at least a peripheral portion of the membrane vent to the battery container around the perforation.

29. (previously presented) Apparatus for battery venting comprising a battery having a battery case, at least one

perforation in the battery case, a porous substrate adjacent the perforation in the battery case, and a selectively permeable membrane on the porous substrate for venting from the battery.

30. (previously presented) The apparatus of claim 29, further comprising a catalytic layer and a diffusive layer on the membrane for recombining gases generated within the battery case and for venting the battery.

31. (previously presented) The apparatus of claim 29, wherein the membrane selectively passes hydrogen gas and does not allow water, carbon dioxide, and oxygen to pass through.

32. (previously presented) The apparatus of claim 30, further comprising a catalytic surface on at least one side of the membrane forming a gas recombination mechanism for recombining gases generated within the battery case.

33. (previously presented) The apparatus of claim 32, wherein the gases generated comprise hydrogen and oxygen, and wherein the catalytic surface recombines the hydrogen and oxygen to generate water for use within the battery.

34. (previously presented) The apparatus of claim 32, wherein the catalytic surface comprises catalysts metals selected from transition metals forming the gas recombination mechanism for the gases generated within the battery case.

35. (previously presented) The apparatus of claim 34, wherein the transition metals are selected from the group consisting of platinum, palladium, nickel, copper, silver, chromium, molybdenum, tungsten, cobalt, iron, ruthenium,

titanium, zirconium, vanadium, niobium, tantalum, and combinations thereof.

36. (previously presented) The apparatus of claim 34, further comprising alloys of the transition metals.

37. (previously presented) The apparatus of claim 36, wherein the alloys are selected from the group consisting of carbon, silicon, tin, and combinations thereof.

38. (previously presented) The apparatus of claim 30, wherein the membrane comprise coatings on the porous substrate.

39. (previously presented) The apparatus of claim 38, wherein the coatings comprise selectively permeable materials.

40. (previously presented) The apparatus of claim 39, further comprising pores in the porous substrate plugged with the selectively permeable materials.

41. (previously presented) The apparatus of claim 40, wherein the substrate comprises etched nuclear particle track dielectric film having the pores plugged with the selectively permeable material.

42. (previously presented) The apparatus of claim 41, further comprising coatings of selectively permeable materials on the film.

43. (previously presented) The apparatus of claim 41, wherein the film is selected from the group consisting of polycarbonate plastic, polyester, polyimide, polypropylene, and combinations thereof.

44. (previously presented) The apparatus of claim 40,

wherein the substrate is of material selected from the group consisting of porous plastics, porous metals, porous glasses, porous ceramics, porous semiconductors, and combinations thereof.

45. (previously presented) The apparatus of claim 40, wherein the substrate is selected from the group consisting of porous polyethylene, porous polyethersulfone, and combinations thereof.

46. (previously presented) The apparatus of claim 40, wherein the selectively hydrogen permeable materials are selected from the group consisting of transition metals, transition metal compounds, transition metals alloys, and combinations thereof.

47. (previously presented) The apparatus of claim 40, wherein the selectively permeable materials are selected from the group consisting of Pt, Pd, Pd alloy, Pd/Ag alloy, Pd/Cu alloy, Ti/Ni alloy, AB_2, $ZrMn_2$, AB_5, $LaNi_5$, La, Ti, Zr, V, Nb, Ta, Cr, Mo, W, Fe, Ru, Co, and combinations thereof.

48. (previously presented) The apparatus of claim 30, wherein the membrane comprises a gas permeable coating thereon.

49. (previously presented) The apparatus of claim 48, wherein the gas permeable coating is selected from the group consisting of silicone rubber, polyvinyl chloride, polyethylene, fluorosilicone, nitrile silicone, natural rubber, polytetrafluroethylene, polymer electrolytes, perfluorosulfonic acid, and combinations thereof.

50. (previously presented) The apparatus of claim 48, further comprising electrolytes in contact with the selectively

permeable coating for electrochemical catalysis of hydrogen or oxygen and/or for catalytic recombination of hydrogen and oxygen.

51. (previously presented) The apparatus of claim 50, wherein the electrolytes form a permeable coating in contact with the selective permeable coating for electrochemical catalysis of hydrogen or oxygen and/or catalytic recombination of hydrogen and oxygen, wherein the coatings form the diffusion layer for limiting rate of recombination and for limiting the recombination to the catalyst surface.

52. (previously presented) The apparatus of claim 30, wherein the membrane further comprises a non-selective gas permeable coating and a hydrogen selectively permeable coating on the non-selective gas permeable coating.

53. (previously presented) The apparatus of claim 30, further comprising diffusion gas mats disposed on the membrane.

54. (previously presented) The apparatus of claim 30, further comprising a seal for sealing the membrane to the battery case and for diffusing gas through the perforation in the battery case.

55. (previously presented) The apparatus of claim 54, wherein the seal comprises a heat or pressure stamp at least partially around the perforation in the battery case.

56. (previously presented) The apparatus of claim 30, wherein the membrane comprises the porous substrate including plugged pores, plural layers of selectively permeable materials on the substrate, gas diffusion mats on the substrate, and seals

for sealing the membrane to the battery case for diffusing gas through the perforation in the battery case.

57. (previously presented) The apparatus of claim 30, wherein the membrane comprises the substrate including plugged pores of substrate, etched nuclear particle track dielectric films, coatings of selectively permeable materials on the film, and gas diffusion mats sealed to the membrane and to the battery case for diffusing gas through a vent hole in the battery case.

58. (previously presented) The apparatus of claim 30, further comprising a pressure relief valve.

59. (previously presented) The apparatus of claim 58, wherein pressure relief valve is formed by the membrane or by a burst foil of the battery.

60. (previously presented) A battery vent apparatus comprising a battery case having at least one opening and a gas selective permeable catalytically active gas recombination membrane secured over the opening in the battery case for venting batteries.

61. (previously presented) A gas vent apparatus for batteries comprising a sealed battery container, a perforation in the sealed battery container, a gas selective permeable catalytically active membrane vent and gas recombination mechanism integral with a porous substrate and covering the perforation in the sealed battery container, and a perimeter seal extending at least partially around the membrane for sealing at least a peripheral portion of the membrane vent to the battery

container around the perforation.

62. (previously presented) A method for venting batteries comprising providing at least one perforation in a battery case, disposing a gas selective permeable membrane in the battery case, and venting the batteries through a porous substrate adjacent the perforation in the battery case.

63. (previously presented) The method of claim 63, further comprising facilitating catalysis with a catalytic layer on the membrane, recombining gases generated within the battery case, and diffusing gases through a diffusive layer on the membrane.

64. (previously presented) The method of claim 63, wherein the diffusing comprises passing hydrogen gas preferentially over other gases through the membrane.

65. (previously presented) The method of claim 64, wherein the passing hydrogen gas comprises passing hydrogen gas preferentially over water, carbon dioxide, and oxygen.

66. (previously presented) The method of claim 63, wherein the catalyzing comprises catalyzing the gases on catalytic surfaces on both sides of the membrane and recombining the gases generated within the battery case.

67. (previously presented) The method of claim 63, wherein the catalyzing with the catalytic surface comprises providing catalysts metals from the transition metal elements and recombining the gases from within the battery case.

68. (previously presented) The method of claim 67, wherein the catalysts are selected from the group consisting of platinum,

palladium, nickel, copper, silver, chromium, molybdenum, tungsten, cobalt, iron, ruthenium, titanium, zirconium, vanadium, niobium, tantalum, and combinations thereof.

69. (previously presented) The method of claim 67, wherein the selecting comprises alloying the transition metal with material selected from the group consisting of carbon, silicon, tin, and combinations thereof.

70. (previously presented) The method of claim 63, wherein the disposing the membrane comprises forming the membrane by coating the porous substrate.

71. (previously presented) The method of claim 70, wherein the coating the porous substrate comprises coating with selectively permeable materials.

72. (previously presented) The method of claim 63, wherein the disposing the membrane comprises forming the membrane by coating and plugging pores of the substrate with selectively permeable materials.

73. (previously presented) The method of claim 72, wherein the coating and plugging pores of the substrate comprises a substrate of etched nuclear particle track dielectric films.

74. (previously presented) The method of claim 73, wherein the films are selected from the group consisting of polycarbonate plastic, polyester, polyimide, polypropylene, and combinations thereof.

75. (previously presented) The method of claim 72, wherein the forming by coating and plugging pores of the substrate

comprises selecting the substrate from the group consisting of porous plastics, porous metals, porous glasses, porous ceramics, porous semiconductors, and combinations thereof.

76. (previously presented) The method of claim 72, wherein the forming by coating and plugging pores of the substrate comprises selecting the substrate from the group consisting of porous polyethylene, porous polyethersulfone, with selectively permeable materials.

77. (previously presented) The method of claim 70, wherein the coating comprises coating with selectively hydrogen permeable materials selected from the group consisting of transition metals, transition metal compounds, transition metal alloys, and combinations thereof.

78. (previously presented) The method of claim 70, wherein the coating the porous substrate comprises coating with vacuum deposition of the selectively permeable materials.

79. (previously presented) The method of claim 78, wherein the materials are selected from the group consisting of Pt, Pd, Pd alloy, Pd/Ag alloy, Pd/Cu alloy, Ti/Ni alloy, AB_2, $ZrMn_2$, AB_5, $LaNi_5$, La, Ti, Zr, V, Nb, Ta, Cr, Mo, W, Fe, Ru, Co, and combinations thereof.

80. (previously presented) The method of claim 70, further comprising coating the membrane with a gas permeable coating.

81. (previously presented) The method of claim 80, wherein the gas permeable coating is selected from the group consisting of silicone rubber, polyvinyl chloride, polyethylene,

fluorosilicone, nitrile silicone, natural rubber, polytetrafluroethylene, polymer electrolytes, perfluorosulfonic acid, and combinations thereof.

82. (previously presented) The method of claim 63, further comprising providing electrolytes in contact with the selective permeable membrane, electrochemically catalyzing hydrogen or oxygen and catalytic recombining of hydrogen and oxygen.

83. (previously presented) The method of claim 63, further comprising coating the membrane with a gas permeable coating of electrolytes in contact with the selective permeable membrane, electrochemically catalyzing hydrogen or oxygen, catalytic recombining of hydrogen and oxygen recombination, limiting the recombining to the catalytic surface by the diffusion layer, and limiting rate of recombination of the hydrogen and oxygen.

84. (previously presented) The method of claim 70, further comprising coating the membrane with a non-selective gas permeable coating and coating the hydrogen selectively permeable coating over the non-selective gas permeable coating.

85. (previously presented) The method of claim 63, further comprising placing diffusion gas mats on the membrane.

86. (previously presented) The method of claim 63, sealing the membrane to the battery case with a seal and diffusing gas through the perforation in the battery case.

87. (previously presented) The method of claim 86, wherein the sealing comprises heat or pressure stamping the seal at least partially around the perforation in the battery case.

88. (previously presented) The method of claim 63, further comprising forming the membrane by coating and plugging pores of the porous substrate thereby forming a porous membrane, coating layers of selectively permeable materials on the substrate, sealing gas diffusion mats to the substrate and to the battery case, and diffusing gas through the perforation in the battery case.

89. (previously presented) The method of claim 63, further comprising forming the membrane by plugging pores of the substrate of etched nuclear particle track dielectric films, coating with selectively permeable materials, sealing gas diffusion mats to the membrane and to the battery case, and diffusing gas through a vent hole in the battery case.

90. (previously presented) The method of claim 63, further comprising providing a pressure relief valve.

91. (previously presented) The method of claim 90, wherein the pressure relief valve is formed by the membrane or by burst foil.

92. (previously presented) A battery venting method comprising providing a battery case having at least one opening, securing a gas selective permeable catalytically active gas recombination membrane over the at least one opening in the battery case, and venting the battery.

93. (previously presented) A gas venting method for batteries, comprising providing a sealed battery container, forming a perforation in the sealed battery container, integrally

forming on a porous substrate a gas selective permeable catalytically active membrane vent and gas recombination mechanism, covering the perforation in the sealed battery container with the membrane vent, sealing at least partially around the membrane with a perimeter seal, and sealing at least a peripheral portion of the membrane vent to the battery container around the perforation.